App. Serial No. 09/932,085
Docket No. NL 000460
Office Action Response and Amendment

In the Claims:

The entire set of pending claims (including amendments to the claims) is submitted herewith per 37 CFR § 1.121(c)(3). This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended): An energy recovery matrix display driver circuit for generating a voltage ~~(Ye)~~ having a periodically changing polarity across a capacitive load ~~(CL)~~, said driver circuit comprising:

an inductor ~~(L1)~~ being coupled to the capacitive load ~~(CL)~~,

a first switch ~~(S1)~~ for creating, during a resonance period ~~(Tr)~~, a resonant circuit including the inductor ~~(L1)~~ and the capacitive load ~~(CL)~~ to change said voltage ~~(Ye)~~ from a first polarity to a second polarity, and a second switch ~~(S2)~~ for coupling, after the resonance period, the capacitive load ~~(CL)~~ to a power supply voltage ~~(Vee)~~ having the second polarity,

a switch circuit ~~(S3, D3, S6, D9)~~ connected in parallel with the inductor ~~(L1)~~ for circulating a current ~~(IL1)~~ through the inductor ~~(L1)~~ in a loop formed by said switch circuit and said inductor ~~(L1)~~, said loop being closed not later than an instant at which said current ~~(IL1)~~ changes polarity at the end of the resonance period ~~(Tr)~~, and

a control circuit ~~(CC)~~ for controlling the first switch ~~(S1)~~, the second switch ~~(S2)~~, and the switch circuit to periodically open and close.

2. (currently amended): An energy recovery matrix display driver circuit as claimed in claim 1, ~~characterized in that~~wherein the switch circuit comprises a series arrangement of a diode ~~(D3)~~ and a controlled switch ~~(S3)~~, said series arrangement being connected in parallel with the inductor ~~(L1)~~, said controlled switch ~~(S3)~~ being closed not later than the instant at which said current ~~(IL1)~~ changes polarity at the end of the resonance period ~~(Tr)~~, said diode ~~(D3)~~ being poled to conduct said current ~~(IL1)~~ after it has changed polarity.

3. (currently amended): An energy recovery matrix display driver circuit as claimed in claim 2, ~~characterized in that~~wherein the switch circuit further comprises a series arrangement of a further diode ~~(D9)~~ and a further controlled switch ~~(S6)~~, said further series arrangement being connected in parallel with the inductor ~~(L1)~~, said further controlled switch ~~(S6)~~ being closed not later than an instant at which said current ~~(IL1)~~changes polarity at the end of a further resonance period ~~(Tr')~~ in which the voltage across the capacitive load ~~(CL)~~ changes polarity in an opposite direction with respect to the first-mentioned resonance period ~~(Tr)~~, said further diode ~~(D9)~~ being oppositely poled with respect to the first-mentioned diode ~~(D3)~~.

4. (currently amended): An energy recovery matrix display driver circuit as claimed in claim 1, ~~characterized in that~~wherein the control circuit ~~(CC)~~ is adapted to close the second switch ~~(S2)~~ after the instant at which said loop is closed.

5. (currently amended): A matrix display apparatus comprising a matrix display panel with a matrix of pixels associated with intersecting electrodes, and an energy recovery matrix display driver circuit for generating a voltage ~~(Vc)~~ having a periodically changing polarity across a capacitive load ~~(CL)~~, said driver circuit comprising:

an inductor ~~(L)~~ being coupled to the capacitive load ~~(CL)~~,

a first switch ~~(S1)~~ for creating, during a resonance period ~~(Tr)~~, a resonant circuit including the inductor ~~(L1)~~ and the capacitive load ~~(CL)~~ to change said voltage ~~(Vc)~~ from a first polarity to a second polarity, and a second switch ~~(S2)~~ for coupling, after the resonance period (Tr), the capacitive load ~~(CL)~~ to a power supply voltage ~~(Vcc)~~ having the second polarity,

a switch circuit ~~(S3, D3, S6, D9)~~ connected in parallel with the inductor ~~(L1)~~ for circulating a current ~~(IL1)~~ through the inductor ~~(L1)~~ in a loop formed by said switch circuit and said inductor ~~(L1)~~, said loop being closed not later than an instant at which said current ~~(IL1)~~ changes polarity at the end of the resonance period ~~(Tr)~~, and

a control circuit ~~(CC)~~ for controlling the first switch ~~(S1)~~, the second switch ~~(S2)~~, and the switch circuit to periodically open and close.

6. (new): An energy recovery matrix display driver circuit for generating a voltage having a periodically changing polarity across a capacitive load, said driver circuit comprising:

an inductor being coupled to the capacitive load;

a first switch for creating, during a resonance period, a resonant circuit including the inductor and the capacitive load to change said voltage from a first polarity to a second polarity;

a first current path, including at least one diode and a second switch, for passing current, after the resonance period, from a power supply voltage having the second polarity to the capacitive load;

a second current path, including at least one diode and an additional switch, for selectively passing current from the capacitive load to a common node having the first polarity;

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a switch circuit connected in parallel with the inductor for circulating a current through the inductor in a loop formed by said switch circuit and said inductor, said loop being closed not later than an instant at which said current changes polarity at the end of the resonance period; and

a control circuit for controlling the first switch, the second switch, the additional switch and the switch circuit to periodically open and close.

7. (new): An energy recovery matrix display driver circuit as claimed in claim 6, further including a common node shared by each of the inductor, the capacitive load, the first current path, and the second current path.

8. (new): An energy recovery matrix display driver circuit as claimed in claim 6, wherein the control circuit is adapted for controlling the switch circuit in order to limit electro-magnetic interference.

9. (new): An energy recovery matrix display driver circuit as claimed in claim 6, wherein the control circuit is adapted for controlling the switch circuit in order to limit the circulating current.